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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,701	11/25/2003	Oleg Kiselev	VRT0106US	7436

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EXAMINER	
DAYE, CHELCIE L	

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2161	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/722,701	KISELEV, OLEG	
	Examiner	Art Unit	
	Chelcie Daye	2161	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is issued in response to applicant's RCE filed April 11, 2007.

2. Claims 1-21 are presented. No claims added and none cancelled.

3. Claims 1-21 are pending.

4. Applicant's arguments filed April 11, 2007, have been fully considered but they are not persuasive.

Continued Examination Under 37 CFR 1.114

5. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 11, 2007 has been entered.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-10 and 13-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning (US Patent No. 6,691,245) filed October 10, 2000, in view of Takeda (US Patent Application No. 20040172509) filed June 23, 2003.

Regarding Claims 1,13,16,and 19, DeKoning discloses a method comprising:

receiving a request to read a portion of data from first data storage (column 5, lines 20-29, DeKoning), wherein the request is received by a receiving module of a first host, the first host can access the first data storage (Fig.1; column 6, lines 26-28 and 63-65, DeKoning)[1], and the first host cannot access second data storage (column 6, lines 45-55, DeKoning)[2];

requesting a requested portion of a copy of the data in the second data storage from a second host that can access the second data storage (Fig.1; column 6, lines 63-67 and column 7, lines 1-5 & 22-40, DeKoning); and

receiving the requested portion from the second host (column 9, lines 39-62, DeKoning). However, DeKoning is silent with respect to reading the portion of the data by reading the requested portion received from the second host, and when a sub-portion of the portion of the data is not included in the requested portion received from the second host, reading the sub-portion from the first data

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[1] Examiner Notes: Within Fig.1, item 106 represents the first host and item 108 represents the first data storage. Also, communication link 118 demonstrates how the first host has access to the first data storage.

[2] Examiner Notes: As stated within column 6, lines 45-55, if a disaster disrupts the first data storage and/or the first host, the second host and second data storage will not be affected, because they are storage at a remote location. Also, as seen within Fig.1, the first host 106 is connected to the first data storage 108, only, and the first data storage connects to the second data storage 110, by communication link 122. As can be seen there is no direct link (i.e. access) from the first host 106 to the second data storage110.

storage. On the other hand, Takeda discloses reading the portion of the data by reading the requested portion received from the second host ([0061-0062], Takeda), and when a sub-portion of the portion of the data is not included in the requested portion received from the second host, reading the sub-portion from the first data storage ([0063-0065], Takeda). DeKoning and Takeda are analogous art because they are from the same field of endeavor of data storage with remote mirrors. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Takeda's teachings into the DeKoning system. A skilled artisan would have been motivated to combine as suggested by Takeda at [0005] and [0012], in order to devise a technology where a plurality of storage subsystems connected through a network, are managed collectively and provided to the user as a plural subsystem. Thereby, allowing the user to use the plurality of storage subsystems as if it were a single storage subsystem, allowing for less trafficking to the hosts.

Regarding Claims 2,14,17,and 20, the combination of DeKoning in view of Takeda, disclose the method further comprising:

determining that a second portion of the data in the first data storage is unavailable (column 10, lines 51-54, DeKoning);

creating a third data storage upon performing the determining, wherein the first host can access the third data storage ([0139], Takeda), and

causing each subsequent change to the data in the first data storage to be written to the third data storage ([0140], lines 3-10, Takeda).

Regarding Claims 3,15,18,and 21, the combination of DeKoning in view of Takeda, disclose the method wherein

when the portion of the data comprises an updated portion in the third data storage, the reading the portion of the data comprises reading the updated portion from the third data storage ([0140], Takeda)[3].

Regarding Claim 4, the combination of DeKoning in view of Takeda, disclose the method wherein the second portion of the data is unavailable because the second portion of the data is corrupted (column 5, lines 34-43, DeKoning).

Regarding Claim 5, the combination of DeKoning in view of Takeda, disclose the method wherein the second portion of the data is unavailable because a device of the first data storage is unavailable (column 5, lines 34-43, DeKoning).

Regarding Claim 6, the combination of DeKoning in view of Takeda, disclose the method further comprising:

[3] Examiner Notes: Fig.8, item 60, corresponds to the third data storage.

replicating data in the third data storage to fourth data storage accessible by the second host ([0141], lines 1-4, Takeda)[4], wherein the fourth data storage cannot be accessed by the first host (column 6, lines 45-55, DeKoning).

Regarding Claim 7, the combination of DeKoning in view of Takeda, disclose the method wherein the copy of the data in the second data storage was copied from a previous version of the data in the first data storage at a previous point in time (column 6, lines 3-21, DeKoning).

Regarding Claim 8, the combination of DeKoning in view of Takeda, disclose the method wherein

the data in the second data storage is a log of changes made to data in the first data storage after a previous point in time (column 7, lines 22-40, DeKoning); and

the requested portion is a set of changes in the log of changes, wherein each change in the set of changes comprises a change to the portion of the data, wherein the change was made after the previous point in time (column 8, lines 18-31, DeKoning).

Regarding Claim 9, the combination of DeKoning in view of Takeda, disclose the method wherein the requesting the requested portion comprises:

[4] Examiner Notes: Fig.8, item 62, corresponds to the fourth data storage.

identifying a set of changed regions of a first plurality of regions of the first data storage using a set of indicators, wherein each indicator of the set indicates whether at least one change was made to data in a respective region of the first data storage (column 8, lines 22-44, DeKoning), and;

adding each region of the set of changed regions to the requested portion (Fig.3; column 8, lines 18-21, DeKoning).

Regarding Claim 10, the combination of DeKoning in view of Takeda, disclose the method further comprising:

determining whether the data in each region of the first plurality of regions of the first data storage is synchronized with the copy of the data in a corresponding region of a second plurality of regions of the second data storage (column 8, lines 24-33, DeKoning); and

when the data in one region of the first plurality of regions is not synchronized with the copy of the data in the corresponding region of the second plurality of regions, identifying a set of unsynchronized regions of the first data storage, wherein each region in the set of unsynchronized regions is unsynchronized with a corresponding region of the second data storage ([0069], Takeda), and

forcing replication of the data in the set of unsynchronized regions to the copy of the data in the second data storage prior to requesting the requested portion ([0073-0074], Takeda).

8. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning (US Patent No. 6,691,245) filed October 10, 2000, in view of Takeda (US Patent Application No. 20040172509) filed June 23, 2003 as applied to claims 1-10 and 13-21 above, and further in view of Carlson (US Patent No. 6,377,959) filed May 20, 1996.

Regarding Claim 11, the combination of DeKoning in view of Takeda, disclose the method wherein

the determining whether the data in each region of the first data storage is synchronized with the copy of the data in the corresponding region of the second data storage (column 8, lines 24-33, DeKoning). However, the combination of DeKoning in view of Takeda are silent with respect to determining whether a lag in replication from the first data storage to the second data storage exists, and when the lag exists, determining that the first data storage and the second data storage are unsynchronized. On the other hand, Carlson discloses determining whether a lag in replication from the first data storage to the second data storage exists (column 7, lines 64-67, Carlson), and when the lag exists, determining that the first data storage and the second data storage are unsynchronized (columns 7-8, lines 67 and 1-10, respectively, Carlson). DeKoning, Takeda, and Carlson are analogous art because they are from the same field of endeavor of database recovery procedures. It would have been obvious to one of ordinary skill in the art

at the time of the invention to incorporate Carlson's teachings into the DeKoning in view of Takeda system. A skilled artisan would have been motivated to combine as suggested by Carlson at column 2, lines 59-67, in order to satisfy a need within the art for a dual database system that maintains two databases with identical entries for fault tolerance. Therefore, providing an active database system which copies one record at a time while interleaving updates into the operation stream at the redundant database, thereby allowing the databases to be concurrent.

Regarding Claim 12, the combination of DeKoning in view of Takeda, and further in view of Carlson, disclose the method wherein the determining whether the lag in replication from the first data storage to the second data storage exists comprises:

examining a replication map for the first data storage, wherein the replication map comprises an indicator for each region of the first plurality of regions, the indicator for each region indicates whether data in a respective region of the first data storage have changed but have not yet been replicated (column 8, lines 22-44, DeKoning); and

when at least one respective region of the first plurality of regions has the indicator, determining that the lag exists (column 7, lines 64-67, Carlson).

Response to Arguments

Applicant argues the cited art fails to teach, "requesting a requested portion of a copy of the data in the second data storage from a second host that can access the second data storage".

Examiner respectfully disagrees. As stated in the action above, DeKoning illustrates at Fig.1 a remote host and a remote storage, which corresponds to the second host and second data storage. Also, columns 6-7, lines 63-67 and 1-5, wherein "*The data volumes 124 are typically accessed by the local host device 106 (FIG. 1) according to access requests from the client devices 104 (FIG. 1). After failure of the local host and/or storage device 106 or 108 (FIG. 1), the data volumes 126 are typically accessed by the remote host device 109 according to the access requests from the client devices 104. Some of the volumes 124 and 126 may be mirrored (e.g. volumes 128 and 132, 133 and 134) between the local and remote storage devices 108 and 110, and some other volumes (volumes 136, 138 and 140) may not be mirrored*". It is noted that the data volumes being requested by the remote host device, which has access to the remote storage device, are accessing the mirrored volumes located within the remote storage device. The mirrored volumes are well known within the art as being a copy of a data set. Further, column 7, lines 22-40 was cited for disclosing more information about the requested copy of data in the remote storage, as stated, "*The remote storage device also includes a "snapshot" repository. The snapshot repository is a portion of the overall memory space in the remote storage device that is reserved for incremental snapshots of the mirrored volumes...for example, the snapshots preferably*

contain a copy of preexisting data from the mirrored volumes that has been replaced by new or changed data, from the local volumes". The above argues limitation has been fully disclosed.

Applicant argues the cited art fails to the newly amended feature "when a sub-potion of the portion of the data is not included in the requested portion received from the second host, reading the sub-portion from the first data storage".

Examiner respectfully disagrees. Applicant's arguments as stated above with respect to newly amended claims 1,13,16, and 19, have been considered but are moot in view of the new ground(s) of rejection. It is noted however, the combination of DeKoning in view of Takeda, in fact disclose the newly above-argued amendment. For example, Takeda discloses at paragraphs [0063-0065], wherein "*the data that had been stored in the PVOL before the journal acquisition process was started is not transferred to the secondary disk array device even when the journal copy processing was started. Therefore, it is necessary to copy these data (hereafter "initial data") to SVOL from PVOL. In the present embodiment, an initial copy is used to transfer the initial data from the PVOL to SVOL. The initial data are transferred sequentially from the volume head area to the end of PVOL...The restore or restoration process involves updating or copying the data of PVOL in the SVOL using the journal that have been received from the primary disk array device according to the copy process*". It is noted that these citations discuss the process of and initial copy process where, when data that was not initially transferred to the SVOL (i.e., secondary volume, which is managed by the

secondary host) from the PVOL (i.e., primary volume, managed by the primary host) by the journal acquisition process (which is noted as being the requested portion received – see [0042], lines 5-11), it then becomes necessary to copy the remaining data from the PVOL. As such, the journal copy is noted as being the requested portion that was read and the initial copy being the non-transferred data, which was not included in the requested portion and is therefore being read from the PVOL.

Points of Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chelcie Daye whose telephone number is 571-272-3891. The examiner can normally be reached on M-F, 7:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu Mofiz can be reached on 571-272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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June 5, 2007

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